REMARKS/ARGUMENTS

In the specification, paragraph one, on page 10 and paragraph one on page 13 have been amended to correct minor editorial problems. The Brief Description of the Drawings has been amended to include a brief description of newly added Figure 14. Paragraph one on page 18 has been amended to include a reference to newly added Figure 14. Claims 1-44 remain in this application, while claims 1, 7-9, 12, 28-29, 33, and 38-42 have been amended.

The Office Action

The drawings were objected to under 37 C.F.R. 1.83(a).

Claim 41 was rejected under 35 U.S.C. 112 second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 33 and 34 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walker (U.S. Patent No. 4,694,387).

Claim 35 was rejected under 35 U.S.C. 103(a) as being unpatentable over Walker as applied to claims 33 and 34 and further in view of Taniguchi (U.S. Patent No. 6,700,357).

Claims 37 and 38 were rejected under 35 U.S.C 103(a) as being unpatentable over Walker as applied to claims 33 and 34 and further in view of the British document No. 1310361.

Claim 36 was rejected under 35 U.S.C. 103(a) as being unpatentable over Walker taken with Taniguchi as applied to claim 35 and further in view of the British document No. 1310361.

Claims 1-10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27-32, 39 and 44 were rejected under 35 U.S.C 103(a) as being unpatentable over Walker as applied to claims 33 and 34 and further in view of Blankenship (U.S. Patent No. 5,351,175).

Claims 11, 14, 17, 20, 23, 26, 40 and 43 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walker taken with Taniguchi as applied to claim 35 and further in view of Blankenship.

Claims 41 and 42 were rejected under 35 U.S.C. 103(a) as being unpatentable over Walker taken with the British document No. 1310361 as applied to claims 37 and 38 and further in view of Blankenship.

AMENDMENTS TO THE DRAWINGS:

The attached sheet of drawings includes a new Figure 14. This sheet, replaces the original sheet including Figures 12 and 13. In Figure 2, a saturable reactor with a rectangular cross-section as in claims 11, 14, 17, 20, 23, 26, 35 and 40 is shown.

Attachment: Replacement Sheet

The Objection to the Drawings

The Examiner objected to the drawings in that they did not show every feature of the invention specified in the claims. Accordingly, a new FIGURE 14 has been added, showing the rectangular cross-section as in claims 11, 14, 17, 20, 23, 26, 35, and 40. The specification has been amended accordingly to include a reference to the new figure. No new matter has been entered. As such, applicants submit that the drawings are now in compliance and the objection should be removed.

The Section 112, Second Paragraph, Rejection

The examiner asserts that claim 41 is indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, there was no antecedent basis for "said ring." Accordingly, claim 41 has been amended. As such, applicants request that the rejection to claim 41 under 35 U.S.C. 112, second paragraph, be withdrawn.

The Obviousness Rejections

The present invention relates to one or more saturable reactors connected in series with the transformer of a power source. Such saturable reactors inhibit voltage during the time immediately after one of the switch pairs is rendered conductive. This delayed action prevents power from being coupled to the secondary network of the transformer at the output of the inverter power source. Thus, the switch pairs are rendered conductive for a greater time allowing the diode clamping network of the two primary circuits time to balance the charge on the capacitors, whereby the capacitors remain in balance during the high speed switching operation. The setting of the time delay for the saturable reactors is generally about 1.0 ms. This allows adequate time for the clamping networks of the two switching circuits to operate properly and balance the voltages on the input capacitors of the two series connected primary circuits.

A. Claims 1-44

Independent claims 1, 33, and 39-41 (as amended) are directed to a *passive* saturable reactor made of a *soft ferrite* material and having a *fixed saturation flux density*. Thus, the soft ferrite saturable reactor of the present invetion does not include a control

winding that influences the time when saturation and desaturation occurs. (See page 10, lines 13-14, and page 13, lines 19-21, of the specification.) Rather, saturation is fixed by the material and dimensions of the saturable reactor around the leads. (See page 13, line 21, to page 14, line 1, of the specification.) Thus, the saturable reactor delays the pulses in the primary by preventing current flow until the reactor is saturated.

On the other hand, the primary reference cited by the Examiner, Walker (U.S. Pat. No. 4,694,387), includes a *reset winding 14* (*i.e.*, a control winding) to set the bead flux density. As noted in column 2, lines 35-28, the induction device of Walker comprises:

> "a 'bead' or generally cylindrical body 10 of magnetically permeable material, such as ferrite. The bead is symmetrical about a central axis 11 and has an axial aperture 12 through which an insulated wire or conductor 13 passes. *A reset winding 14 is wound on the bead 10 and comprises several turns of wire which passes through the aperture 12 and about the body of the bead.*" (Emphasis added.)

In column 2, lines 45-54, Walker goes on to explain how FIG. 2 shows that:

> "*the reset winding 14 is used to set the bead flux density at point A.* This is actually two ampere turns. Hence, a reset winding consisting of ten turns needs only 0.2 amps to set the bead at point A. If i(t) is assumed to be one ampere, positive, this moves the bead flux density to point B. When a current spike occurs on conductor 13, as when the power transistors of a power inverter are simultaneously on, ΔB_3 is now available to absorb volt-seconds." (Emphasis added.)

As explained more fully in Walker's Summary of the Invention (column 2, lines 4-14):

> "the volt-second absorption capability of a ferrite bead is increased by adding a reset winding to the bead. A reset voltage is used to set the bead flux density at a point where a very large change in flux density is available to absorb volt-seconds. The invention is particularly advantageous in a power inverter circuit for protecting power MOSFETs. The use of the reset winding makes all of the bead volt-second absorbtion capability available and prevents destructively high current spikes in the power transistors in the event that they are simultaneously on."

In other words, the saturable reactor of Walker is not passive and it does not have a fixed saturation flux density, like the saturable reactor as described in the present application and as presented in the claims. Indeed, hard ferrite saturable reactors, such as the one found in Walker, *must* use a control winding to adjust the time window where saturation/desaturation occurs. Such an approach is time consuming, expensive and less attractive as a saturable reactor to delay the voltages of the input series circuits. (See

Specification at page 15, lines 1-6.)

The other references cited by the Examiner fail to overcome the aforementioned deficiencies of Walker. Accordingly, the pending claims (1-44) are not obvious in view of the cited references.

B. Claims 1-32, 39 and 44

Further, independent claims 1 and 39 call for using the saturable reactor of the present invention in an electric arc welder. The Examiner has asserted that it would have been obvious to incorporate the ferrite ring of Walker into any well known inverter power supply, such as the welding power supply of Blankenship. The Examiner has provided no reference, or other evidence to support his conclusion that it would be obvious to one skilled in the art to modify the welding power supply of Blankenship with the saturable reactor of Walker, aside from a conclusory statement that the circuit topology associated with S1 and S2 of Blankenship is "similar" to the protected circuitry of 101 and 102 in Walker. Applicant asserts that the Examiner has impermissibly concluded that claims 1 and 39 are obvious in view of a combination of Blankenship and Walker without any legitimate support on the record and respectfully requests that, in accordance with the obligations imposed under MPEP § 2144.03 (should a rejection of amended claims 1 and 39 be maintained), the Examiner provide a reference of other suitable evidence showing that one skilled in the art would be motivated to modify the teachings of Blankenship with the teachings of Walker.

As the Examiner is aware, a *prima facie* case of obviousness is not established absent proper motivation. Simply because the ferrite ring of Walker *could* be used in other circuits, a motivation to modify Blankenship to meet the limitations of amended claims 1 and 39 is not formed. Moreover, accordingly to MPEP § 2144.01, the "fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness." Merely because the claimed elements are individually found in the prior art, it does not necessarily follow that it would be obvious to combine the elements from different prior art references. *See MPEP § 2141.01 citing Ex parte Levengood*, 28 USPQ 2d 1300 (Bd. Pat, App. & Inter. 1993). Indeed, welding machines operate with hundreds of amperes of output current. Small imbalances in the current of a few amperes that are negligible in the operation of the welding machine can cause the square loop saturable reactor to saturate at the wrong time. To overcome this

process deficiency of hard ferrite saturable reactor used in a welding operation, a saturable reactor such as the one taught by Walker must use a control winding to adjust the time window where saturation and desaturation occurs. This, however, is time consuming, expensive and less attractive as a saturable reactor to delay the voltages of the input series circuits. Thus, the present invention uses a soft material of the type having a soft curve 302 as shown in FIG. 7.

Consequently, absent a motivation to combine and modify Walker with the teachings of Blankenship, it is irrelevant that the elements and/or limitations may be individually or separately known in the prior art. Clearly, the Examiner is motivated to combine these teachings for no other reason than to arrive at the claimed invention. This is a classic example of impermissible hindsight.

Accordingly, claim 1 and claims 2-32, which depend therefrom, and claim 39 and claim 44, which depends therefrom are further patentably distinct over the references of record for the reasons discussed herein.

C. Claims 7, 38 and 42

Further still, the saturable reactor of claims 7, 38 and 42 (as amended) includes the features of a heat sink tube 360 that is formed from a highly conductive material and has a cylindrical base 362 with outwardly expanding fins 364 and an expandable assembly gap 366, as shown in FIG. 11 and described on page 17, lines 17-20, of the specification. No such heat sink is taught or suggested by Walker or the British document No. 1,310,361. Thus, claims 7, 38 and 42 are not obvious over Walker in view of the British document. Accordingly, in addition to depending from allowable independent claims as discussed above, these claims are further patentably distinct over the references of record for the reasons discussed herein.

D. Claim 8

Additionally, the saturable reactor of claim 8 (as amended) is cooled by heat sink disks 380, 382 having holes 384, 386, which are at least as large as the internal diameter 370, as shown in FIG. 13 and described on page 18, lines 1-3, of the specification. No such heat sink is taught or suggested by Walker or any of the other cited references. Accordingly, in addition to depending from claim 1, which is patentably distinct as discussed above, claim 8 is further patentably distinct over the references of record for the reasons discussed herein.

CONCLUSION

All formal and informal matters having been addressed, it is respectfully submitted that this application is in condition for allowance. It is believed that the claim changes clearly place the application in condition for allowance, defining over any fair teaching attributable to the references of record. Accordingly, an early notice of allowance is earnestly solicited.

Respectfully submitted,

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